

WHAT IS CLAIMED IS:

1. A control apparatus for a vibration type actuator, which makes driving vibration at a driving unit of a vibration member by applying an alternating signal to an electro-mechanical energy conversion element and uses at least a frequency of the alternating signal as a speed control parameter, said apparatus comprising:

a driving circuit capable of changing a driving voltage of the alternating signal to be applied to said electro-mechanical energy conversion element; and

a control circuit which controls said driving circuit so that at least an absolute value of a tilt of a frequency-speed characteristic of said actuator is within a desired range in a frequency band of predetermined range.

2. A control apparatus for a vibration type actuator, which makes driving vibration at a driving unit of a vibration member by applying an alternating signal to an electro-mechanical energy conversion element and uses at least a frequency of the alternating signal as a speed control parameter, said apparatus comprising:

a driving circuit capable of changing a driving voltage of the alternating signal to be applied to said electro-mechanical energy conversion element; and

10022338 122001

5

10

15

20

6. An apparatus according to Claim 2, wherein
said driving circuit includes a switching circuit which

performs on and off operations in response to a driving pulse and applies a voltage according to the switching operation of said switching circuit to said electro-mechanical energy conversion element, and said control
5 circuit changes the width of the driving pulse according to the frequency so that the absolute value of the tilt of the frequency-speed characteristic of said actuator is the predetermined value or more.

10 7. An apparatus according to Claim 1, further comprising a detection circuit which detects a speed and/or a position of said vibration type actuator, wherein said control circuit changes the driving voltage on the basis of detection information from said
15 detection circuit if said actuator reaches a predetermined position or a movement amount.

20 8. A control apparatus for a vibration type actuator, which makes driving vibration at a driving unit of a vibration member by applying an alternating signal to an electro-mechanical energy conversion element and controls at least a frequency of an alternating signal as a speed control parameter, said apparatus comprising:

25 a driving circuit capable of changing a driving voltage of the alternating signal to be applied to said electro-mechanical energy conversion element; and

a control circuit for at least performing control
in a frequency range higher than a predetermined
frequency so that the driving voltage to be applied to
said electro-mechanical energy conversion element by
5 said driving circuit decreases as the predetermined
frequency becomes a higher frequency.

9. An apparatus according to Claim 8, wherein
said control circuit decreases the driving voltage to
10 be applied to said electro-mechanical energy conversion
element as the predetermined frequency becomes a higher
frequency so that an absolute value of a tilt of a
frequency-speed characteristic in case of changing a
frequency of said actuator by a unit amount is within a
15 predetermined range or is a predetermined value or
more.

10. An apparatus according to Claim 8, wherein
the driving voltage is changed by changing a driving
20 pulse width in said driving circuit of applying the
driving voltage to said electro-mechanical energy
conversion element.

11. An apparatus according to Claim 8, wherein
25 the driving voltage is changed by changing a gain of an
amplifier in said driving circuit of applying the
driving voltage to said electro-mechanical energy
conversion element.